UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/826,503	04/05/2001	Charles H. Carter JR.	CM03024J	7883

7590 09/03/2008

Frank M. Scutch, III
Motorola, Inc.
Law Department
8000 West Sunrise Boulevard
Fort Lauderdale, FL 33322

EXAMINER	
ENSEY, BRIAN	
ART UNIT	PAPER NUMBER
2615	

MAIL DATE	DELIVERY MODE
09/03/2008	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte CHARLES H. CARTER, JR.

Appeal 2008-2478
Application 09/826,503
Technology Center 2600

Decided: September 3, 2008

Before KENNETH W. HAIRSTON, JOHN A. JEFFERY,
and CARLA M. KRIVAK, *Administrative Patent Judges*.

JEFFERY, *Administrative Patent Judge*.

DECISION ON APPEAL

Appellant appeals under 35 U.S.C. § 134 from the Examiner's rejection of claims 1 and 3-8. We have jurisdiction under 35 U.S.C. § 6(b). We affirm-in-part.

STATEMENT OF THE CASE

Appellant invented a method for calibrating a speaker and microphone. The method includes the steps of generating a pseudo random noise, directing the noise from a speaker to a microphone, and adjusting coefficients of a digital signal processor connected to the microphone to a desired frequency response. The method enables communication devices to operate consistently throughout operation regardless of slight operational dissimilarities between the speaker and microphone components.[1] Independent claim 8 is illustrative:

> 8. A method of acoustic transducer calibration for optimizing the frequency response and gain of an internal speaker located within a portable communication device comprising the steps of:
>
> generating a source of acoustic pseudo random noise from at least one digital signal processor located in the portable communications device;
>
> providing the acoustic pseudo random noise to the internal speaker;
>
> directing the acoustic pseudo random noise from the internal speaker to a microphone in the portable communications device;
>
> porting the output of the internal speaker to the at least one digital signal processor;
>
> comparing the acoustic pseudo random noise with an output of the at least one digital signal processor; and
>
> adjusting a plurality of coefficients in the at least one digital signal processor based upon differences in the acoustic pseudo random noise and the output of the at least one digital signal processor

[1] *See generally* Spec. 1:5-8, 2:6-10, and 2:28 – 6:16.

to produce an optimized internal speaker output for the portable communications device.

The Examiner relies upon the following as evidence in support of the rejection:

Powter	US 3,912,880	Oct. 14, 1975
Rapaich	US 4,631,749	Dec. 23, 1986
Eatwell	US 5,481,615	Jan. 2, 1996
Richardson	US 5,771,297	Jun. 23, 1998
Wong	US 5,881,103	Mar. 9, 1999

1. Claim 8 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over Richardson and Powter.

2. Claim 5 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over Richardson, Powter, and Wong.

3. Claim 6 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over Richardson, Powter, Wong, and Eatwell.

4. Claims 1, 3, 4, and 7 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Richardson, Powter, Wong, and Rapaich.

Rather than repeat the arguments of Appellant or the Examiner, we refer to the Brief[2] and the Answer[3] for their respective details. In this decision, we have considered only those arguments actually made by Appellant. Arguments, which Appellant could have made but did not make

[2] We refer to the most recent Appeal Brief filed December 27, 2007, throughout this opinion.
[3] We refer to the Examiner's Answer mailed May 24, 2007, throughout this opinion.

in the Brief, have not been considered and are deemed to be waived. *See* 37 C.F.R. § 41.37(c)(1)(vii).

REJECTION OVER RICHARDSON AND POWTER

We first turn to the rejection of claim 8 under 35 U.S.C. § 103(a) as being unpatentable over Richardson and Powter. Regarding independent claim 8, the Examiner finds that the combination of Richardson and Powter teaches all the recited elements (Ans. 3-5). Appellant argues that: (1) the microphone in Richardson is a feedback device and does not calibrate the speaker; (2) the position of the microphone in Richardson is not equivalent to Appellant's internal microphone; and (3) Richardson and Powter are not combinable to teach the limitations of claim 8 (Br. 10-11).

ISSUES

The issues are: (1) whether Appellant has shown that the Examiner erred in finding that Richardson discloses a method of acoustic calibration for optimizing the frequency response and gain of an internal speaker, and (2) whether Richardson and Powter are combinable.

FINDINGS OF FACT

The record supports the following findings of fact (FF) by a preponderance of the evidence.

1. Merriam-Webster's Online Dictionary[4] defines the term "calibrate" as "to standardize (as a measuring instrument) by determining the deviation from a standard so as to ascertain the proper correction factors."
2. Richardson discloses an adaptive audio system for a portable communications device that controls the acoustic interface between the radio receiver and the user. The portable communication device can be a land mobile radio (Richardson, col. 1, ll. 6-10, 13-16, and 45-46).
3. Richardson discloses a training audio sequence embodiment that compares the original output signal 60 from a speaker to the microphone's output signal 54. The device measures the original output against the microphone's output and the digital signal processor 50 (DSP) derives distortion factors based on the differences in these values in order to adapt audio gain and frequency response in the future (Richardson, col. 3, l. 63 - col. 4, l. 25; Fig. 4).
4. Richardson states the microphone can be located in the numerous places and that all the components are within a housing of the electronic audio device (Richardson, col. 1, ll. 13-17, col. 1, l. 67 – col. 2, l. 7, and col. 2, ll. 16-17).
5. Richardson discloses generating a source of noise from a DSP, including complex audio waveforms. The waveforms include swept

[4] Merriam-Webster's Online Dictionary, 10th ed., *available at* http://www.merriam-webster.com/cgi-bin/dictionary?book=Dictionary&va=calibrate (last visited Aug. 12, 2008).

two-tone and/or a single-tone sweep and may be several sequences (Richardson, col. 4, ll. 4-8).

6. Powter teaches a known method of generating pseudo random noise in order to measure frequency responses and loudness ratings of a microphone (Powter, col. 1, ll. 3-7 and 38-42 and col. 3, ll. 11-31).
7. Powter teaches using pseudo random noise avoids having to take repeated measurements and averaging the measurements to eliminate the effects of random fluctuations. The application of the pseudo random generator also improves the stability of the results (Powter, col. 1, ll. 20-26 and col. 2, l. 63 – col. 3, l. 10).
8. The Federal Communications Commission (FCC)[5] explains that a private land mobile radio has the ability to coordinate people and materials and to assist in safety, security, and emergency needs.
9. ICOM®[6] explains that land mobile radios provide two-way communication.
10. Richardson discloses an adaptive method of using an internal microphone and speaker in order to adapt audio gain and frequency response to all ambient noise levels for the speaker while compensating for the acoustic transducer characteristics (Richardson, col. 3, l. 66 – col. 4, ll. 17 and col. 4, ll. 40-43).
11. Appellant's Specification discusses the step of directing the noise to an input of an internal microphone separately from the step of

---

[5] FCC Private Land Mobile Radio Services, *available at* http://wireless.fcc.gov/services/index.htm?job=service_home&id=private_land_radio (last visited Aug. 14, 2008).

[6] ICOM® Land Mobile Products, *available at* http://www.icomamerica.com/en/landmobile/ (last visited Aug. 14, 2008).

applying the noise to an internal speaker using the same pseudo random noise generator 201. The arrows in Figures 1 and 3 show the direction of the pseudo random noise (Spec. 2:31-3:3 and 5:6-12; Figs. 1-4).

12. Richardson discusses discontinuing the noise directed to an input of an internal speaker when the training sequence has ended and then enters operational mode (Richardson, col. 4, ll. 20-23).

13. Wong discloses providing a noise to an external speaker (Wong, col. 3, ll. 62-66 and col. 4, ll. 31-39).

PRINCIPLES OF LAW

In rejecting claims under 35 U.S.C. § 103, it is incumbent upon the Examiner to establish a factual basis to support the legal conclusion of obviousness. *See In re Fine*, 837 F.2d 1071, 1073 (Fed. Cir. 1988). In so doing, the Examiner must make the factual determinations set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 17 (1966).

Discussing the question of obviousness of a patent that claims a combination of known elements, *KSR Int'l v. Teleflex, Inc.*, 127 S. Ct. 1727 (2007), explains:

> When a work is available in one field of endeavor, design incentives and other market forces can prompt variations of it, either in the same field or a different one. If a person of ordinary skill can implement a predictable variation, § 103 likely bars its patentability. For the same reason, if a technique has been used to improve one device, and a person of ordinary skill in the art would recognize that it would improve similar devices in the same way, using the technique is obvious unless its actual application is beyond his or her skill. *Sakraida* [*v. AG Pro, Inc.,* 425 U.S. 273 (1976)] and *Anderson's-Black*

> *Rock*[*, Inc. v. Pavement Salvage Co.*, 396 U.S. 57 (1969)] are illustrative—a court must ask whether the improvement is more than the predictable use of prior art elements according to their established functions.

KSR, 127 S. Ct. at 1740. If the claimed subject matter cannot be fairly characterized as involving the simple substitution of one known element for another or the mere application of a known technique to a piece of prior art ready for the improvement, a holding of obviousness can be based on a showing that "there was an apparent reason to combine the known elements in the fashion claimed." *Id.* at 1741.

If the Examiner's burden is met, the burden then shifts to the Appellant to overcome the prima facie case with argument and/or evidence. Obviousness is then determined on the basis of the evidence as a whole and the relative persuasiveness of the arguments. *See In re Oetiker*, 977 F.2d 1443, 1445 (Fed. Cir. 1992).

Additionally, during examination of a patent application, a claim is given its broadest reasonable construction "in light of the specification as it would be interpreted by one of ordinary skill in the art." *In re Am. Acad. Of Sci. Tech. Ctr.*, 367 F.3d 1359, 1364 (Fed. Cir. 2004).

ANALYSIS

Appellant argues that Richardson fails to disclose the internal microphone is used to calibrate the speaker as recited. Specifically, Appellant contends that the position of the microphone in Richardson is used "to sense clipping" and not to calibrate the acoustic transducer for frequency response and gain of an internal speaker within a portable communication device (Br. 10). Moreover, Appellant reasons the internal microphone of

Richardson is not equivalent to the recited internal microphone due to its positioning (Br. 10).

During examination of a patent application, a claim is given its broadest reasonable construction "in light of the specification as it would be interpreted by one of ordinary skill in the art." *In re Am. Acad. Of Sci. Tech. Ctr.*, 367 F.3d at 1364 (Fed. Cir. 2004). The Specification provides no definition for "calibrate" or "calibration," and Appellant has not provided evidence that the term has special meaning in the art. We must, therefore, give the term its ordinary customary meaning. *Phillips v. AWH Corp.*, 415 F.3d 1303, 1312 (Fed. Cir. 2005) (en banc). Merriam-Webster's Online Dictionary defines the term "calibrate" as "to standardize (as a measuring instrument) by determining the deviation from a standard so as to ascertain the proper correction factors" (FF 1). As such, we find the phrase, "a method of acoustic transducer calibration" to mean a method of standardizing an acoustic transducer by determining the deviation from a standard so as to ascertain the proper correction factors.

Richardson discloses an adaptive audio system for a portable communications device that controls the acoustic interface between the radio receiver and the user (FF 2). Richardson discloses an embodiment that runs a training audio sequence in order to compare the original output signal or a standard from a speaker to the microphone's output signal (FF 3). The device measures the original output against the microphone's output and the DSP then derives distortion or corrective factors based on the differences in these values in order to adapt audio gain and frequency response in the future (FF 3). Because this training sequence operation in Richardson measures the output signal of the microphone against a standard or the

output signal, Richardson does more than sense clipping and calibrates the acoustic transducer for optimizing the frequency response and gain of an internal speaker as recited in claim 8.

Additionally, Richardson states the microphone can be located in the numerous places and that all the components are within a housing of the electronic audio device or a portable radio (FF 4). Richardson, therefore, discloses "a microphone in the portable communications device" as recited in claim 8. Thus, contrary to Appellant's assertion (Br. 10), the microphone in Richardson is within the housing of a portable communication device and is equivalent to an internal microphone.

Lastly, Appellant argues Richardson and Powter are not combinable because Powter fails to teach calibrating the microphone or speaker and uses an external noise source (Br. 10-11). We first note that claim 8 does not recite a method of calibrating a microphone, rather a method of "calibration for optimizing the frequency response and gain of an internal speaker." Thus, any argument that the references do not teach calibrating a microphone is not commensurate with the scope of the claims. Moreover, as explained above, Richardson discloses the step of calibrating the speaker.

With respect to the external noise argument, Richardson discloses generating a noise from a DSP, such as complex audio waveforms, like swept two-tone and/or a single-tone sweep or several sequences of waveforms (FF 5). Powter has been cited to teach an alternative known method of generating pseudo random noise directed to a microphone in order to measure frequency responses and loudness ratings (FF 6). Powter teaches that using pseudo random noise over other types of noise (e.g., white) avoids having to take repeated measurements and averaging to

eliminate the effects of random fluctuations. Such application also improves the stability of the results (FF 7). As the Examiner indicates, one skilled in the art would have recognized the benefit discussed in Powter could be applied to Richardson to "provide a single, stable training signal with [a] plurality of represented frequencies for the frequency based comparison of the system of Richardson that avoids the necessity of repeated scans of the acoustic spectrum" (Ans. 5). Powter, therefore, provides ample reason to combine the teachings of Powter with Richardson to yield no more than a predictable result, and Appellant has not successfully rebutted the prima facie case of obviousness.

For the above reasons, Appellant has not shown error in the obviousness rejection of claim 8 based on the collective teachings of Richardson and Powter. Accordingly, we sustain the rejection of claim 8.

REJECTION OVER RICHARDSON, POWTER, AND WONG

We next turn to the rejection of claim 5 under 35 U.S.C. § 103(a) as being unpatentable over Richardson, Powter, and Wong. Claim 5 recites a method of acoustic transducer calibration for tuning an internal microphone and internal speaker in a portable two-way radio including the steps of supplying the compensated pseudo random signal to a speaker external to the portable two-way radio and filtering the output of the internal microphone to provide a compensated microphone signal. The Examiner finds that the combination of Richardson, Powter, and Wong teaches all recited elements (Ans. 5-7). Appellant argues: (1) Richardson only discloses a test microphone and not an internal microphone for two-way radio

operation and (2) neither Richardson nor Powter, individually or combination, teach calibrating a microphone (Br. 11-12).

Claim 5 recites a "method of acoustic transducer calibration for tuning an internal microphone and internal speaker in a portable two-way radio" and an "internal microphone associated with the portable two-way radio." Given the breadth of this claim, nothing precludes a test microphone internal to the portable radio, but not used in two-way communication, from reading on the recited "internal microphone." Moreover, Richardson discloses the method is useful in many applications, including adaptive audio systems for land mobile radios (FF 2). A land mobile radio is a two-way radio. For example, the FCC explains that private land mobile radios have the ability to coordinate people and materials and to assist in safety, security, and emergency needs (FF 8). Additionally, ICOM® explains that land mobile radios provide two-way communication (FF 9). Thus, contrary to the Appellant's contention (Br. 11), Richardson can be used for two-way radio operation.

Appellant also contends that neither Richardson nor Powter discloses calibrating a microphone. Claim 5, however, recites "a method of acoustic transducer calibration for tuning an internal microphone and internal speaker in a portable two-way radio." Richardson discloses an adaptive method of using an internal microphone and speaker in order to adapt audio gain and frequency response to all ambient noise levels for the speaker while compensating for the acoustic transducer characteristics (FF 10). This operation calibrates a transducer for tuning the internal speaker based not only on the output of the speaker (FF 10), but also on the output of the microphone 54. That is, the speaker's calibration is dependent on the gain

and frequency response of the microphone and uses the properties of both an internal speaker and microphone to calibrate an acoustic transducer. By using the characteristics of the internal microphone to derive the distortion cofactors, the method in Richardson tunes the microphone with respect to the speaker and has, in effect, tuned both the microphone and speaker. Richardson also states several training sequences may be used (FF 5). Thus, as the sequences proceed, the feedback from the microphone is repeatedly used to derive the distortion cofactors and the speaker and microphone are effectively tuned to each other. The training operation in Richardson, therefore, discloses a "method of acoustic transducer calibration for tuning an internal microphone" as recited in claim 5.

For the above reasons, Appellant has not shown error in the obviousness rejection of claim 5 based on the collective teachings of Richardson, Powter, and Wong. Accordingly, we sustain the rejection of claim 5.

REJECTION OVER RICHARDSON, POWTER, WONG, AND EATWELL

We now turn to the rejection of claim 6 under 35 U.S.C. § 103(a) as being unpatentable over Richardson, Powter, Wong, and Eatwell. The Examiner finds that the combination of Richardson, Powter, Wong, and Eatwell teaches all recited elements (Ans. 7-8). Apart from merely reciting the limitations of claim 6 and referring to the previous arguments pertaining to claim 5, Appellant does not provide any explanation or analysis particularly pointing out errors in the Examiner's prima facie case of obviousness with respect to claim 6 (Br. 12). These arguments, however, fall well short of persuasively rebutting the Examiner's prima facie case of

obviousness for the reasons indicated previously. We therefore incorporate our previous discussions by reference.

For the above reasons, Appellant has not shown error in the obviousness rejection of claim 6 based on the collective teachings of Richardson, Powter, Wong, and Eatwell. Accordingly, we sustain the rejection of claim 6.

REJECTION OVER RICHARDSON, POWTER, WONG, AND RAPAICH

We lastly turn to the rejection of claims 1, 3, 4, and 7 under 35 U.S.C. § 103(a) as being unpatentable over Richardson, Powter, Wong, and Rapaich. Appellant groups the claims as follows: (1) claim 7, and (2) claims 1, 3, and 4 (App. Br. 13). Each grouping will be addressed separately.

Claim 7

Regarding independent claim 7, the Examiner finds that the combination of Richardson, Powter, Wong, and Rapaich teaches all the recited limitations (Ans. 8-12). Appellant reiterates the argument that neither Richardson nor Powter discloses optimizing a microphone and also states that Wong does not overcome the purported deficiencies (Br. 13). Our previous discussion regarding Richardson disclosing the feature of a method of acoustic transducer calibration for tuning or "optimizing the frequency response and gain of a microphone" with regard to claim 5 applies equally to this argument, and we hereby incorporate that discussion by reference.

For the above reasons, Appellant has not shown error in the obviousness rejection of claim 7 based on the collective teachings of

Richardson, Powter, Wong, and Rapaich. Accordingly, we sustain the rejection of claim 7.

Claims 1, 3, and 4

Independent claim 1 differs in scope from independent claims 5, 7, and 8. Claim 1 recites a method for acoustic transducer calibration that includes the steps of providing a source of pseudo random acoustical noise to an external speaker source separate from the portable communication device, directing the source of pseudo random acoustical noise to an input of an internal microphone, adjusting first coefficients for a desired microphone frequency response, discontinuing the source of pseudo random acoustical noise, applying the source of pseudo random acoustic noise to an internal speaker source, and adjusting second coefficients for a desired internal speaker frequency. Appellant once again reiterates the argument that neither Richardson nor Powter discloses internal microphone calibration and also states that Wong does not overcome the purported deficiencies (Br. 13).

Method steps are not ordinarily construed to require an order unless they expressly or implicitly require performance in that order. *Altiris, Inc. v. Symantec Corp.*, 318 F.3d 1363, 1369 (Fed. Cir. 2003) (citing *Interactive Gift Express, Inc. v. Compuserve Inc.*, 256 F.3d 1323 (Fed. Cir. 2001)). "First, we look to the claim language to determine if, as a matter of logic or grammar, [the method steps] must be performed in the order written." *Altiris*, 318 F.3d at 1369. If the claim language itself does not require performing the steps in that order, we then look to the Specification "to determine whether it directly or implicitly requires such a narrow construction." *Id.* at 1370.

Based on the language of claim 1, we find that the step of discontinuing the noise from the external speaker does not have to be performed before the step of applying the noise to an internal speaker source. The step places no time condition on when to discontinue the noise provided to the external speaker source. The Specification, however, implicitly requires a narrow construction of the recited discontinuing step to be performed before the step of applying the noise to an internal speaker.

The Specification discloses the calibration of the internal microphone and the internal speaker using the same pseudo random noise generator 201 occur separately. Specifically, the Specification discusses the step of directing the noise to an input of an internal microphone separately from the step of applying the noise to an internal speaker. The arrow symbols in Figures 1 and 3 further show the separate application (FF 11). Moreover, if the pseudo random noise generator were to provide noise to both the external speaker and the internal speaker simultaneously, the internal microphone would be receiving noise from both speakers at the same time. Such an arrangement would only interfere with the calibration of the components. Thus, we find that the Specification implicitly requires the step of discontinuing the noise from the external speaker to be performed before the step of applying the source of pseudo random acoustical noise to an internal speaker source as recited in claim 1. With this understanding in mind, we turn to the cited prior art.

The Examiner relies on Richardson and Wong to teach the step of discontinuing the source of pseudo random acoustical noise from the external speaker source (Ans. 11). Neither of the cited passages in the references (Richardson, col. 4, ll. 2-23 and Wong, col. 4, ll. 37-41) discloses

this step. Wong discloses the step of providing a noise to an external speaker (FF 13) but fails to discuss discontinuing the noise. Richardson discusses discontinuing the noise directed to an input of an internal speaker only when the training sequence has ended and then enters operational mode (FF 12). Additionally, the Examiner has not provided an explanation why the references teach or suggest to one skilled in the art to include the step of discontinuing the pseudo random noise source after adjusting the first coefficients for a desired microphone frequency and before applying the same pseudo random noise to an internal speaker source. The remaining cited prior art of Powter and Rapaich also do not overcome this deficiency. Thus, we find that the combination of Richardson, Powter, Wong, and Rapaich does not teach or suggest the step of discontinuing the source of pseudo acoustical noise from the external speaker as recited in claim 1.

For the above reasons, Appellant has shown error in the obviousness rejection of claim 1 based on the collective teachings of Richardson, Powter, Wong, and Rapaich. Accordingly, we will not sustain the rejection of independent claim 1 or dependent claims 3 and 4 for similar reasons.

CONCLUSION

For the foregoing reasons, Appellant has not shown error in the Examiner's obviousness rejections of claims 5-8. Appellant, however, has shown error in the Examiner's obviousness rejection of claims 1, 3, and 4.

DECISION

The decision of the Examiner to reject claims 1 and 3-8 is affirmed-in-part.

No time period for taking any subsequent action in connection with this appeal may be extended under 37 C.F.R. § 1.136(a)(1)(iv).

AFFIRMED-IN-PART

KIS

Frank M. Scutch, III
Motorola, Inc.
Law Department
8000 West Sunrise Boulevard
Fort Lauderdale, FL 33322